

Driver alert

Research started by a team at The Australian National University in 1997 has led to the development of faceLAB, information and communications technology (ICT) that can be used to track the movement of a driver's head, including head position and orientation, and which way the eyes are looking and blinking rate.

To commercialise the results, Seeing Machines Ltd (www.seeingmachines.com) was set up in 2000. In 2005, the company entered a research

collaboration agreement with National ICT Australia (NICTA), which is Australia's ICT Centre of Excellence and receives Australian Government and Australian Research Council funding. The aim is to explore the use of ICT to reduce road accidents relating to driver fatigue by warning drivers before they become too drowsy.

The system was trialled successfully in the United States earlier this year, when it was installed in trucks for a large oil field services and mining company, and it will soon be installed in trucks servicing oilfields in Canada.

Seeing Machines also has a development agreement with an

automotive industry supplier in Germany, with the aim of going into serial production of driver monitoring systems for heavy vehicles.

The work with the companies in Germany and North America led to the recent production release of the Driver State Sensor – Research (DSS-R), a research version of technology aimed at research organisations and fleet trials.

The product's rugged design and fully automatic operations are said to make it ideal for permanent and unsupervised installation in vehicles. The Australian mining industry will no doubt keep an eye on commercialisation of this product.

So how does the DSS-R work?

The DSS-R finds the driver's face, automatically generating a model that takes into account unique facial features. This takes less than a second.

Once modelled, the DSS-R begins real-time 3D head pose tracking and the system will find and track eyelid closure. This provides detection of driver attention and distraction.

All measurements are optimised so that natural head motion does not degrade head tracking performance.

For detecting fatigue, the DSS-R comes with two algorithms. One is a simple detection of micro-sleep events characterised by the driver closing the eyes for more than a pre-defined period. The second algorithm is a widely accepted standard called PERCLOS.



PERCLOS observes the eyelid closure signal to establish a fatigue metric that considers measurements taken over several minutes. Optional audio alarms can be raised as a result of either of these metrics.